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ABSTRACT

This paper provides a framework for the discussion of policy and development of educational quality. Based on the choice of indicators, the purpose of assessment, and the type of evaluation, the paper proposes a whole-matrix approach to addressing the critical issues in assessing and monitoring educational quality. These critical issues include maintaining a balance between the basic functions of monitoring and between school self-evaluation and external evaluation, choosing an appropriate combination of quality indicators, determining who decides which indicators and standards to examine, and managing the differences between school-level and system-level evaluation. The whole-matrix framework, which uses multiple indicators to monitor multiple levels, was used to map profiles of educational quality in Hong Kong schools. A survey of 62 primary schools was conducted in 1991 and 1993. The more comprehensive 1993 survey was administered to 56 principals, 1,407 teachers, 219 classrooms, and 7,102 students. The paper describes how the framework served the purposes of both internal development and external accountability. The information gained from such an evaluation can be then used for educational improvement. Two approaches to enhancing educational quality include the external-control approach and school-based management. Four figures are included. (LMI)

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Monitoring Education Quality in Schools: Framework and Technology

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Monitoring Education Quality in Schools: Framework and Technology

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(abstract)

This paper aims to provide a framework for the policy discussion, formulation and research on quality and standards of school education and also introduce a technology for monitoring education quality in schools.

Based on the choice of indicators, the purpose of monitoring, and the type of evaluation, the paper proposes that a matrix can be formed to explore the critical issues in assessing and monitoring education quality. There may be three approaches to designing the assessment and monitoring. Among them, the Whole Matrix Approach should be most powerful and can produce more comprehensive, reliable, and useful information. From the above matrix, the paper explores some basic dilemmas and issues in monitoring education quality and explains that the external control approach and the school-based approach are two different approaches to enhancing education quality.

The paper also introduces a comprehensive framework and the related technology including multi-levels and multi-indicators for assessing education quality in schools and reports how the technology was used to map the profiles of education quality in different samples of schools in Hong Kong and how the profiles can be used to conduct school-based improvement and development.

(The author would like to acknowledge the Research Grants Council of the University and Polytechnic Grants Committee of Hong Kong for their earmarked research grant awarded to support his research on education quality in Hong Kong schools)

After the rapid expansion of the education systems in the past decades, the Hong Kong government may be now aware of the importance of education quality as well as the potential damage to quality due to poor practice and management existing in schools or other education institutions. A number of policy efforts have been put into improvement of different aspects of education such as curriculum, language teaching, student guidance, student streaming, management, teacher-student ratio, physical environment, and teacher education (Education Commission Reports 1 to 5, 1984-1992; Education & Manpower Branch and Education Department, SMI, 1992). Although these efforts aim at improving education quality and discharging accountability, they are seriously suffering from poor understanding of the complex nature of education quality and lack of a system of education standards and indicators for directing practices and monitoring performance. Without sufficient understanding and a comprehensive system of education indicators, up to now we do not know how good our education systems are and how they are linked with developments of our society. Furthermore, we know very little about how to improve or ensure education quality no matter whether at the site-level or at the system level. These are very serious problems when compared with the huge investment in our education systems. Recently, the Education Commission of the Hong Kong Government (1993) might be concerned about the problems and has set up a working group to study education standards and develop policies for quality assurance in education.

China and some other rapidly developing societies in the Asia-Pacific areas are facing similar problems of education quality in development of education. Currently there are also movements of effective schools, school-based management, and educational reforms in search of education quality in developed countries such as U.S.A., U.K., and Australia (Cheng, 1993b, 1994a). Responding to the rapidly growing concern about education quality in the international and local contexts, this paper aims at contribution to the conceptualization, monitoring, and enhancement of education quality in schools. The paper will develop a framework for the policy discussion, formulation and research on school

education quality and also introduce a technology for monitoring education quality in schools.

Conceptualization of Education Quality

Education quality is a rather vague and controversial concept in research and policy discussion. To different people, the definition may be different and so the indicators used to describe education quality may be different (Hughes, 1988; Fuller, 1986). Some may emphasize the quality of inputs to the education systems but the other on the quality of processes and outcomes. No matter referring to the input, process, outcome, or all of them, the definition of education quality may be associated with the fitness for use (Juran, 1988), the satisfaction of strategic constituencies' (e.g. policy-makers, parents, school management committee, teachers, students, etc.) needs, or the conformance to strategic constituencies' requirements and expectations (Crosby, 1979). Borrowing the ideas from total quality management (Tenner & Detoro, 1992) and system approach, we may define education quality as following:

Education Quality is the character of the set of elements in the input, process, and output of the education system that provides services that completely satisfy both internal and external strategic constituencies by meeting their explicit and implicit expectations.

Since the conception of education quality involves the input, process, output and multiple constituencies of an education system, it is multi-dimensional and cannot be easily assessed by only one indicator. Furthermore, the expectations of different constituencies on education may be very different, if not contradictory. It is often difficult for a school or an education institute to meet all the expectations or needs at the same time. Therefore, it is not rare that the education quality of a school is high to the perceptions of some constituencies but not to the other, or, some aspects of a school may be high quality but the other aspects may be low quality (Hughes, 1988).

In order to assess education quality, different indicators may be developed to give

information about the performance of an education system in different aspects. **Education quality indicator** may be defined as the indicator used to describe the key aspects of education quality in input, process, & outcome at the school level or at the system level. In general, the quality indicators may be classified as input indicators, process indicators, and outcome indicators. The difference in the choice of and the emphasis on indicators may reflect the diverse interests and expectations among the concerned constituencies.

According to Scheerens (1990) and Herpen (1989), the development of education indicators seems to have experienced three trends. The first trend was the transition from social indicators of education (i.e. used to describe the educational aspect of the population) to education indicators used to describe some characteristics (mainly input and resource measures) of education systems. The second trend was the shift towards more comprehensive indicator systems by adding output and context measures and growing interest in manipulable factors and process characteristics. The third trend was more concerned with process characteristics in schools and therefore was to measure data at more than one aggregation level (i.e. national, school, classrooms, students, etc.). Up to now there seems to be no universal set of education indicators that is appropriate for all purposes of different regions or countries. An international project--CERI/OECD is now working for development of international education indicators (Nuttall, 1990).

If we are more interested in education improvement and school effectiveness, the development of education quality indicators may be in light of the third trend, focused more on the process characteristics. The literature that can contribute to the development of a system of indicators of education quality may be divided into three categories:

(1) the previous works on education indicators, performance indicators, quality indicators, and accountability system indicators, such as Nuttall (1990), Windham (1988), Oakes (1986), Benveniste (1987), Scheerens, et al., (1988), and Hopkins & Leask (1989);

(2) the research on school effectiveness and instructional research, such as Wilson & Corcoran (1988), Cheng (1993 c, 1994 c,d,e), Mortimore (1993), Wang & Walberg

(1991), Kyle (1985), and Brophy & Good (1986); and

(3) the works on organizational effectiveness (such as Cameron & Whethen, 1983; Cheng, 1993a, 1994a).

The education aims formally stated by the policy-makers or school management committee often represent these strategic constituencies' explicit expectations of education quality in school particularly on the outcome and process aspects. This is the reason why the education aims are often used to develop education quality indicators.

From the above basic idea of quality indicator, two possible definitions of education standard may be listed as follows:

(1) **An education standard** is the required level at which an education aim should be achieved;

(2) **An education standard** is the required level at which an education quality indicator should reach.

The second definition of education standards may have broader implications for policy-making and education improvement because there is often strong relationship between input, process, and outcome. Therefore, it is adopted for the discussion in this paper. *An education standard is a reference point for the statistic or performance of an quality indicator to be judged as high or low.* In general, an education standard may be set according to a socially agreed-upon standard (e.g. every student should have 6-years compulsory education), a past value or standard (e.g. the average level of language achievement in the last decade), or a comparison across grades, schools, regions, or nations (Nuttall, 1990). Furthermore, education standards may be classified into input standards, process standards, and process standards at the institutional/site/school level (e.g. a primary school, a vocational school, a college of education, etc.), the sub-system level (e.g. the primary schools sub-system, higher education sub-system, technical and vocational education sub-system, etc.), and the whole education system level. Currently, there is strong interest in the international comparison of the functioning of educational systems and the develop-

ment of international education indicators for planning and monitoring the education systems. Nuttall (1990), Herpen (1989), and Bottani (1991) can provide the information about the OCED (Organization for Economic Co-operation and Development) International Education Indicators at the system level. In this paper, the discussion will be limited to the sub-system levels of primary and secondary schools (or simply, the school system level) and the individual school level including the input, process, and outcome aspects.

Functions of Quality Indicators and Education Standards

The design of quality indicators and education standards should serve the function of assessing and monitoring education quality and effectiveness at the school level and at the system level. According to Nuttall (1990), good education indicators at the school level or school system level can provide at least one of the following types of information:

--Information that describes the school's/ the schools system's performance in achieving desired educational conditions or results. This information helps to describe the school's/ schools system's current functioning and effectiveness;

--Information about features of the school/ the schools system known to be linked with desired conditions and outcomes. The information helps school members, policy-makers, educators, and the public to predict future performance of the school/the schools system;

--Information that describes enduring features of the school/ the schools system. The information helps policy-makers and educators better understand how the school/ the schools system works and to assess the implication of changes over time; and

--Information that is relevant to education policy. This information provides insight into current or potential problems in the school/ the schools system that are of particular concern to policy-makers or that are susceptible to change through action.

Specifically, the information provided by the quality indicators and judged education standards can be used to monitor education at both the school level and the school system

level. At the school level, the information can be used to ensure school performance and effectiveness towards the planned school goals and education standards; can help the school to reflect school's environment, reconsider school's direction, re-establish policies, and replan action programs, & reorganize structures; can help individuals, groups, and the school to learn, improve, and develop; and can help the school to assure education quality and school accountability to the public, students, & parents. Similarly, the information can be used to ensure quality and effectiveness of the school system, replan and develop the school system, and assure accountability of the school system to the public.

Basically, the above functions of quality indicators and standards may be classified as two types: (1) formative functions--for internal improvement and development and (2) summative functions-- for accountability and assurance of education quality or cost-effectiveness.

A Matrix of Assessing & Monitoring Education Quality

From the above discussion, the assessment and monitoring of education quality at the school level or the school system level may involve the following basic considerations:

1. The Choice of Indicators: What kinds of quality indicators will be used ? Input indicators? Process or performance indicators? Outcome indicators ? Or the combination of these indicators ?

2. The Purposes: For what functions the assessment and monitoring will be ? For internal improvement and development ? For accountability and quality assurance ? Or, for both of them?

3. The Agents/ Type of Evaluation: Who will be responsible for the assessment and monitoring ? School self-evaluation (the school as the agent) ? External evaluation (by an independent agent) ? Or both of them ?

Based on these considerations, a matrix (the choice of indicators X the purpose X the type of evaluation) may be proposed, as shown in Figure 1, to explore the critical issues

in assessing and monitoring education quality. This matrix illustrates that there are three major approaches to assessing and monitoring education quality:

The Cell Approach: It often uses only one cell or some separate cells of the matrix to formulate the assessment. For example, the assessment uses only school self-evaluation and input indicators, and serves the purpose of internal development (i.e. cell A of the matrix). This approach is simple and easy and may be commonly used in school evaluation. But the results from it are often biased and fragmented because of the lack of complete information about the whole school process and the ignorance of other important aspects. Therefore the implications for improvement, development, and accountability are very limited.

The Layer Approach: It uses one layer of the matrix to design the assessment and monitoring of education quality. Figure 2 provides two examples of the layers. The layer of example 1 suggests that the assessment of education quality includes indicators of input, performance, and outcome, purposes for both internal development and accountability, and school self-evaluation but not external evaluation. The layer of example 2 proposes that the assessment covers school self-evaluation and external evaluation, serves purposes for both internal development and accountability, and uses performance indicators but not input and outcome indicators. The conception of assessment based on layer may be broader than that on separate cell. The results and implications from this approach may not be so limited and biased as those from the cell approach.

The Whole Matrix Approach: The cell approach and the layer approach have strong limitations due to the ignorance of some important components in the matrix. Therefore the comprehensive way to assess and monitor education quality at the school level or the school system level should be based on the whole matrix including all the components of indicators, purposes, and agents. The results and implications from the whole matrix approach should be more comprehensive, reliable, and useful. The current emphasis on the whole school review or inspection including school self-evaluation and external audit, serving formative and summative functions, and using multiple indicators may reflect the

importance of a whole matrix approach to successful assessment and monitoring of education quality (Queensland Department of Education, 1992; Education Commission, 1994; Scottish Office Education Department, 1991, 1992). Of course this approach may be more expensive and time consuming because it covers more components than the other two approaches.

Under the constraints of limited resources, inevitably there are still some basic dilemmas and issues in the use of the whole matrix approach to monitoring education quality.

Issues in Assessing & Monitoring Education Quality

Based on the framework of the matrix, the following are some critical dilemmas and issues:

-- How to keep a balance between the two functions of monitoring education quality ?

Even though we would like to ensure both school's internal development and accountability to the public through monitoring education quality, it is often difficult to maximize these two functions at the same time, particularly if the assessment is limited to one type of evaluation (say, self-evaluation) and one category of quality indicator (say, input indicator). Over-emphasis on the accountability purpose often increases the tendency that the schools create self-defensive mechanism and subsequently this mechanism hinters school self learning and improvement. If we focus too much on school internal development and improvement but less on accountability assurance, those concerned may worry whether the schools are accountable and the educational services are worth the money invested. How to keep a balance between internal development and accountability in designing and implementing the assessment and monitoring of education quality should be a critical issue.

FIGURE 1

Matrix of Assessing/Monitoring Education Quality

(at the school-level / the school system level)

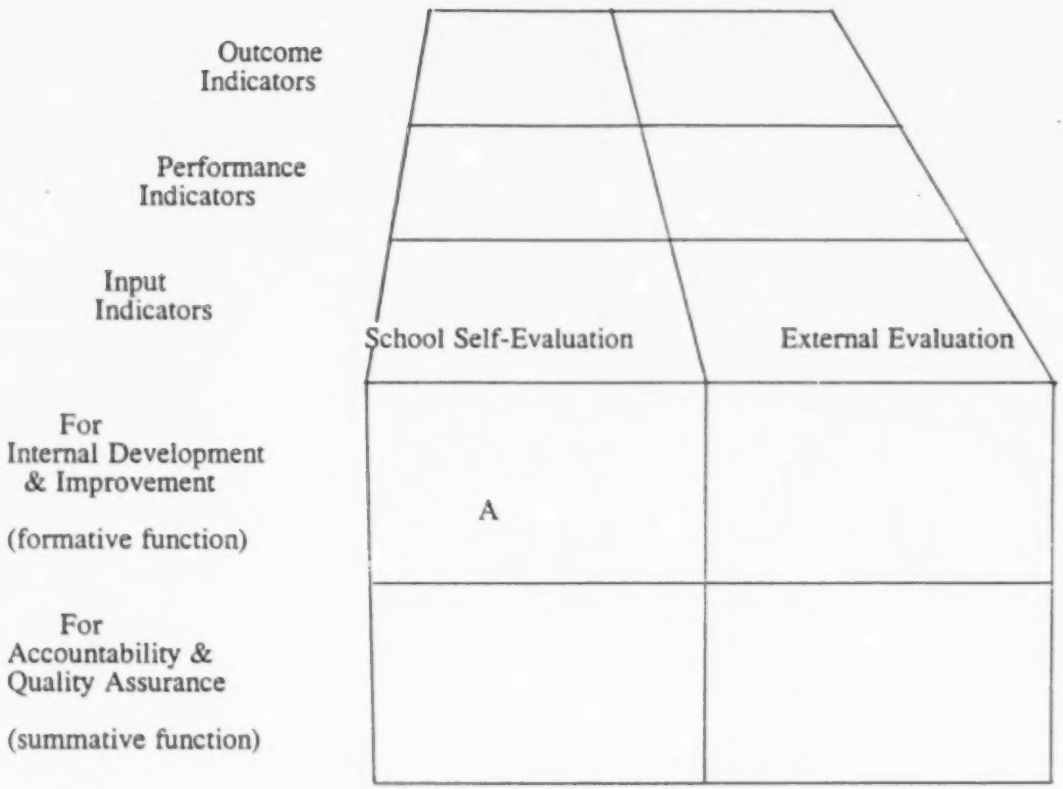
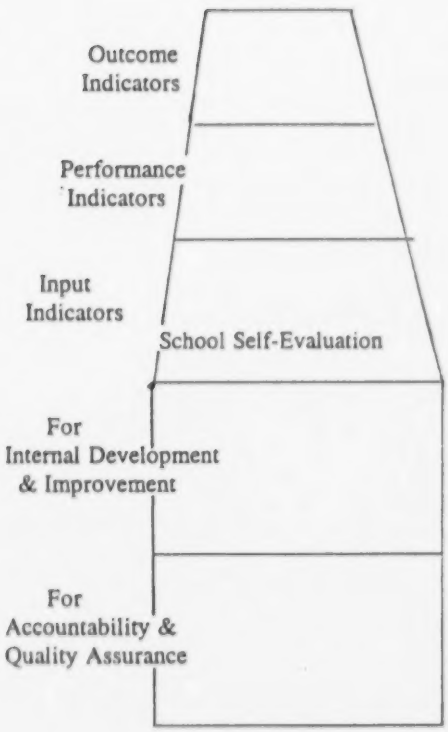


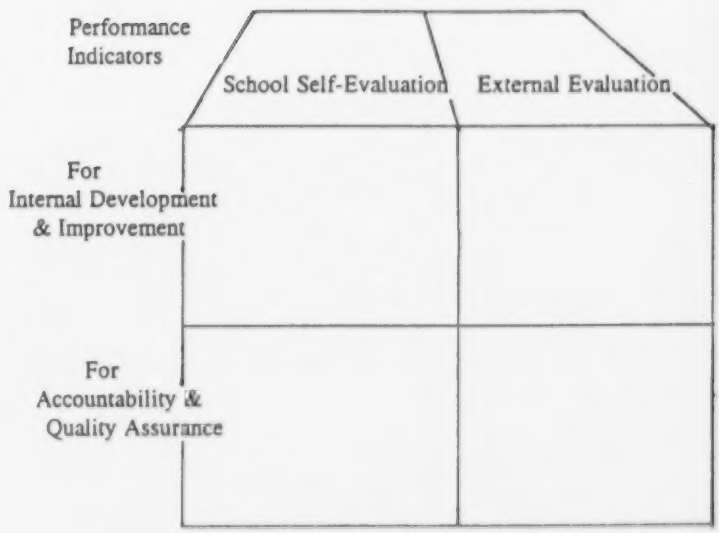
FIGURE 2

Two Examples of Layers

(Example 1)



(Example 2)



-- **How to keep a balance between school self-evaluation and external evaluation ?**

In general, external evaluation by an outside or independent agent is believed to be more objective for the accountability purpose. Traditionally, it is conducted by the school inspection team of the Education Department of the Government. Since the Education Department is often the dominant educational service provider through numerous schools, some people believe that it may not be in the right position to assess independently and objectively the quality of educational service provided in schools . Currently, there is a trend to establish an expert agent independent of the Education Department and schools to conduct external evaluation of the schools (Education Commission, 1994). No matter whether the external evaluation is conducted by the Education Department or an independent agent, it would involve a big number of inspectors and so would be very expensive if it is conducted in depth, covers a wide range of indicators, and samples an appropriately large number of schools. Furthermore, over-emphasis on external evaluation may limit the initiative of the schools and hinter their development. On the other hand, school self-evaluation is based on the schools' own initiative and resources and therefore less expensive. Also it is easier for the schools to be committed to it and can be better for internal improvement and development. Obviously, it may not be so convincing for accountability purpose because the information from self-evaluation may be biased by the evaluators themselves. To keep an appropriate balance between school self-evaluation and external evaluation is necessary in planning monitoring education quality. But how to do it?

-- **How to choose an appropriate combination of quality indicators ?**

For different purposes and types of evaluation, different kinds of quality indicators may be used. For the accountability purpose, outcome indicators such as academic achievements, absence of behavioral problems, attendance rate, etc. are often strongly emphasized in monitoring. For the purpose of improvement and development of the school, staff, and students, performance or process indicators such as systematic planning, school climate, classroom environment, resource management, leadership, motivation,

teaching process, learning process, etc. would be more important. For the detail about indicators for evaluation, please see Cheng (1993d). If we emphasize the external evaluation particularly for monitoring the whole school system, we tend to use the objective and quantitative indicators that are appropriate to nearly all the schools. But if we are concerned mainly with school self-evaluation, the set of indicators developed by one school may not be appropriate to the other. Even though people would like to include indicators as more comprehensive as possible in order to serve different purposes and types of evaluation, it is often difficult to include too many indicators because it will be very time-consuming and expensive particularly when the assessment involves many schools. Therefore, how to choose an appropriate combination of quality indicators of input, performance, and outcome to fit the needs of multiple purposes and different types of assessing and monitoring education quality inevitably becomes a critical question to be answered.

-- **Who make decision on choosing quality indicators and education standards ?**

The choice of quality indicators and education standards may reflect the values, education goals, and preferences of those concerned. Unfortunately, there are often very few indicators and standards commonly accepted by all those concerned. To different people, the choice may be very different. For example, to policy makers, the indicators of resources inputs and policy-related outcomes may be more important because these indicators are related to allocation of resources, efficiency, and accountability. To educators or teachers, the critical indicators should include process indicators particularly those related to the quality of teaching and learning process. To parents, the academic achievement outcomes may be the most necessary indicators of education quality. The diversity of emphasis on quality indicators and education standards may complicate and politicize the process of establishing a program of assessing and monitoring education quality at the school level or at the school system level. Based on different sets of indicators and standards, the directions and results of assessing and monitoring can be very different. Then, the implications to policy making, resources allocation, management responsibility, practice

improvement, and accountability can be of great difference for all those concerned such as policy-makers, inspectors, school managers, principals, school administrators, teachers, parents, students and the community. Therefore, who are the right persons to make decision on the choice of quality indicators and standards is a controversial issue in planning assessment and monitoring of education quality. For the purpose of accountability to the public, the policy-makers and the Education Department often dominate the decisions, particularly at the school system level.

From the perspective of school-based management (Cheng, 1993b), members at the site-level should have their right and responsibility to decide indicators and standards for their own schools, in order to facilitate internal improvement and development. But how these indicators and standards can be consistent with those decided for the system level is often controversial. As a form of compromise or flexibility, the policy-makers may establish a set of core and basic indicators and standards that all schools have to use and observe. In addition to this set, the schools may decide other indicators and standards for their own purposes. Also, the decision making at the school level should include the participation of all the strategic constituencies such as teachers, parents, alumni, and students in addition to the school administrators. Currently the encouragement of participation in school-based management and school review reflects this line of thinking (Cheng, 1993b; David, 1989; Queensland Department of Education, 1992)

-- How to manage the differences between the school level and the school system level ?

The assessment and monitoring of education quality at the school level is often different from that at the school system level in terms of expected purpose, quality indicators, and types of evaluation to be used. The potential differences of assessing education quality between the school level and the school system level can be summarized as shown in Table 1.

At the school system level, the purpose of monitoring may be mainly at ensuring accountability and cost-effectiveness, most of the indicators to be used may be related to

inputs and outcomes, and the type of evaluation to be adopted may be based on external evaluation. It is often difficult to use too many indicators particularly those qualitative process indicators because it will be expensive and time consuming in a large sample of schools. Also monitoring at the school system may not use the information from school self evaluation in order to eliminate the bias in self report. The set of indicators and standards is developed by the policy makers or external agent. The indicators are standardized and can be applied to all the schools in the school system.

But at the school level, the purpose of monitoring may be focused on internal improvement and development, most of the indicators may be related to school process and outcomes, and the type of evaluation may be mainly school self-evaluation. The evaluation can cover a wide range of indicators including qualitative and quantitative indicators. The set of indicators and standards to be used is developed by the schools themselves. The indicators are not necessarily standardized and can be varied across schools. This set may include the core indicators and standards developed for the school system level.

How to manage the above potential differences between the school level and the school system level is important for effective assessing and monitoring of education quality at these two levels. Some people may suggest to reduce the differences and make the two levels nearly the same by (1) converting the characteristics of monitoring at the school level into those at the school system level or the reverse; or (2) integrating the characteristics of both the school level and the school system level and making them appropriate to both these two levels. The line of thinking ignores the uniqueness of monitoring at each level and assumes conversion without any loss in monitoring function and integration without any additional cost and technical problems in assessment. Of course, this assumption is not true. For example, the conversion may emphasize mainly either internal development or accountability but not both. If using integration, it is often very difficult to keep a balance between the two basic functions of monitoring at each level and also it will be very expensive and time-consuming due to the inclusion of too many indicators, as discussed above.

In order to serve the different purposes and fit the different conditions at these two levels, we can accept the potential differences and emphasize monitoring education quality at both levels. We can develop appropriate strategies to keep a balance between the levels and manage them to be mutually supplementary but not contradictory.

Clarifying the above issues is necessary for the development of a system of assessing and monitoring education quality and standards for schools. To a great extent, the current school-based management movements such as "Victoria Schools of the Future" of Australia (Directorate of School Education, 1994) and "School Management Initiative" of Hong Kong (Education & Manpower Branch and Education Department, 1991) can contribute to solving the above issues of monitoring and enhancing education quality.

TABLE 1

Difference between the School Level and the School System Level

	The School Level	The School System Level
Purpose of Monitoring:	Mainly for Internal Improvement & Development	Mainly for Accountability & Cost-Effectiveness
Type of Evaluation:	Based on School Self-Evaluation by School Members	Based on External Evaluation by Outside Agent
Nature of Indicators:	--Mainly Process & Outcome Indicators	--Mainly Input & Outcome Indicators
	--Both Qualitative & Quantitative	--Mainly Quantitative
	--Both Objective & Subjective(Affective)	--Mainly Objective
	--Fit for the School, Not Necessarily Standardized	--Fit for all Schools in the System, Standardized
	--Developed by School Members, May include the Core Indicators for School System Level	--Developed by Education Department or an Outside Agent

A Multi-levels and Multi-indicators Framework

Based on the above discussion, a framework including multi-levels and multi-indicators can be developed to assess education quality in schools. In the light of the current trend of education indicator development, the framework is more concerned with process characteristics in schools and the selection of multi-indicators is based on the previous studies on education indicators, school effectiveness, instructional research, and organizational effectiveness. The collection of data is conducted at more than one aggregation level The framework can be carried out in form of both school self evaluation and external evaluation and serves the purposes of both internal development and external accountability.

Specifically in this framework, education quality in school is defined by the following characteristics:

(1) it represents the overall performance of school members at the individual level, the group level, and the organizational level;

(2) it includes the affective, cognitive, and behavioral components of performance; and

(3) it can be indicated by the satisfaction, perception, and performance of the key school actors.

Based on this conception and the past studies, a framework of multi-indicators at the multi-levels is developed. It includes the student individual and group levels, the teacher individual and group levels, and the school organizational level. At the student individual level, indicators are students' affective and academic performance. At the student group level, the indicators are classroom's human and physical environment and classroom management. The teacher individual level includes indicators of job attitudes, satisfaction, and beliefs. The teacher group level includes indicators of social norms and professionalism. At the organizational level, the indicators are organizational culture, structure, effectiveness, quality of school physical environment, principal-teachers relationship, leadership,

and need for school improvement. In sum, the framework is rather comprehensive and the relevance, validity, and reliability of nearly all the selected indicators are supported by the strong research evidence in the past studies. The detail of the indicators at different levels is illustrated as follows:

Indicators at the Student Individual Level:

a. Indicators of Student attitudes: They are the levels of positive attitudes put towards self, peers, teachers, the school, and learning. These indicators were developed and tested in Cheng (1994c):

--Self concept
--Attitude to peers
--Attitude to teachers
--Attitude to the school
--Attitude to learning

--Attitude Index (=(self+peers+teachers+school+learning)/5)

b. Student satisfactions: They are the extents to which the student is satisfied with different aspects of school life; They were developed from the literature of quality of work life and organizational behavior (Cammann, et al., 1983; Oldman & Hackman, 1981).

--Social satisfaction (i.e. with social relations in school)
--Intrinsic satisfaction (i.e. with opportunities to perform & learn)
--Extrinsic satisfaction (i.e. with school arrangements)
--Overall satisfaction (i.e. with the learning life in school)

--Satisfaction Index (=(social+intrinsic+extrinsic+overall)/4)

c. Negative Feelings: They are negative indicators of student feelings about learning and the school; They were developed in this education quality research project:

--Feeling of homework overload (-)
--Intention to dropout (-)

d. Attainment test results: They are academic indicators got from the results of the Hong Kong public test --Attainment Test on the following subjects:

--Chinese
--English
--Mathematics

Indicators at the Classroom Level:

a. Indicators of Classroom Climate: They are indicators of social climate among students and between students and teacher in classroom; They were adapted from Moos & Tricketts (1974) and had been used widely in different areas and countries, including the following nine indicators:

<among students>
--Affiliation (i.e. the level of friendship students feel for each other)
--Order and Organization (i.e. the level of students behaving in an orderly and polite manner and classroom activities being well organized)
--Competition (i.e. the level of students competing on academic achievement/recognition)
--Involvement (i.e. the level of students having attentive interest in class activities).
<students-teacher>
--Teacher support (i.e. the amount of teachers' help and concern provided to the students).
--Rule clarity (i.e. the level of teachers demanding on establishing a set of clear rules and being consistent in dealing with students who break rules)
--Task orientation (i.e. the level of teachers completing planned classroom activity).
--Teacher control (i.e. the level of teachers strictly implementing the classroom rules).
--Innovation (i.e. the level of teachers being innovative on teaching methodology).

b. Indicator of Quality of Classroom Physical Environment This is an overall quality indicator of classroom physical environment in terms of facilities, space, arrangements, neatness, cleanliness, and comfort, perceived by students or teachers; The indicator was developed in the education quality project and had been used in Cheng (1994c)

c. Indicators of Classroom Management: They are the types of power base the class master uses to influence students' compliance in classroom, perceived by students; They were developed and adapted from French and Raven (1968) and Ho (1989) and had been used and tested in Cheng (1994 b,d, in press):

--Professional power (i.e. based on professional knowledge and skills)
--Position power (i.e. based on school regulations or teacher position)
--Reward power (i.e. based on providing rewards)
--Coercive power (-) (i.e. based on exercising punishment)
--Personal power (i.e. based on class master's own personality and charisma)

d. Indicators of Classroom Arrangements: They were developed in the education quality project, including:

--Insufficient recess time (-) (i.e. for students' to have a break or go to toilet)
--Ignorance of art, physical education, and music (-) (i.e. replaced by academic subjects)
--Appropriateness of class size (perceived by teachers)
--% time for teaching activities (perceived by teachers)
--% time for student behavior problems (-) (perceived by teachers)

Indicators at the Teacher Individual Level

a. Indicators of Job Satisfaction: They were adapted from the literature of quality of work life (Cammann, et al., 1983; Oldman & Hackman, 1981):

--Social satisfaction (i.e. with the social relationship with colleagues)
--Extrinsic satisfaction (i.e. with the salary or benefits provided)
--Intrinsic satisfaction (i.e. with the opportunities to develop and learn)
--Influence satisfaction (i.e. with the opportunities to participate in decision-making and be autonomous)

b. Indicators of Job Attitudes/Feelings: They were adapted from the literature of quality of work life (Cammann, et al., 1983):

--Commitment to the job (i.e. the level of being committed to the job)
--Job challenge (i.e. the level of feeling challenges in teaching job)
--Job meaning (i.e. the level of feeling that teaching job is meaningful)
--Job responsibility (i.e. the level of feeling responsibility in the job)
--Self-report of effort (i.e. the level of effort put into the job reported by self)

c. Indicators of Teaching Efficacy: They were adapted from Gibson & Dembo (1984), Matthes, Tollerud, & Langeveldt (1989), and Woolfolk & Hoy (1990):

--Personal efficacy (i.e. the belief that personal effort in teaching can improve student learning)
--General efficacy (i.e. the belief that teaching can improve student learning even under the disadvantages from students' families)
--Teaching efficacy (=personal + general)

<u>At Teacher Group Level:</u>

a. Indicators of Social Norms: They are indicators of the social relationship or group feelings among teachers; They were adapted from Halpin (1966) and Halpin & Croft (1963) and had been used widely in different studies (Cheng,1991c):

--Intimacy (i.e. the close social relationship among teachers)
--Esprit (i.e. the working morale of teachers)
--Disengagement (-) (i.e. the level of teachers being disengaged from the school)
--Hindrance (-) (i.e. feeling of being burdened with unnecessary work)

b. Indicator of Teacher Professionalism: This is the tendency of teachers being committed to the professional code; It was developed and used in Cheng (1992b).

c. Indicator of Quality of Physical Environment of Staff Room: This is an overall quality indicator of staff room physical environment in terms of facilities, space, arrangements, neatness, cleanliness, and comfortability, perceived by teachers; It was developed in the education quality research project.

<u>Indicators at the Organizational Level</u>:

a. Strength of Organizational Culture : It is the strength of sharing values, beliefs, and assumption about school mission, teaching, learning, and management among school members; Based on the idea of Alvesson (1987) and Price and Mueller (1986), it was developed and tested in Cheng (1993c).

b. Indicators of Organizational Structure: They were adapted and developed Oldman & Hackman (1981) and Hage & Aiken (1967) and had been used in Cheng (1993c, 1994d):

--Formalization (i.e. the level of school functioning being formalized with clear written policies, procedures, and records)
--Hierarchy of Authority (-) (i.e the level of decision-making being centralized in school)
--Participation (i.e the level of teachers participating in decision-making and planning)

c. Indicator of Organizational Effectiveness : This indicator measures the level of effectiveness of school functioning in terms of productivity, adaptability, and flexibility as perceived by teachers; It was adapted from Mott (1972) and had been used in different studies (Cheng, 1991c, 1993c).

d. Indicator of Quality of School Physical Environment: This is an overall indicator of quality of school physical environment in terms of facilities, space arrangements, neatness, being planted, cleanliness, and comfort, as perceived by students or teachers; It was developed in the education quality research project.

e. Indicator of Principal-teachers Relationship : The indicator describes the degree of satisfaction with the social and working relationship between principal-teachers, perceived by teachers; It was developed in the Chan, Cheng, & Hau (1991).

f. Indicators of Principal's Leadership: Based on Bolman & Deal (1991) and Sergiovanni (1984), they were developed and used in Cheng (1994d):

--Human Leadership (i.e. the extent to which the principal is supportive and fosters participation)
--Structural Leadership (i.e. the extent to which the principal thinks clearly and logically, develops clear goals and policies, and holds people accountable for results)
--Political Leadership (i.e. the extent to which the principal is persuasive and effective at building alliances and support and solving conflicts)
--Symbolic Leadership (i.e. the extent to which the principal is inspirational and charismatic)
--Educational Leadership (i.e. the extent to which the principal emphasizes and encourages professional development and teaching improvement)

g. Indicator of School Improvement Need: This indicator assesses the need for improvement in 15 aspects of school functioning such as parental support, quality of student input, instructional resources, physical environment and facilities, staff professional development, morale, student performance, decision participation, teacher appraisal, and administrative procedures and management; The indicator was developed in a school management reform research project (Cheng, 1992a).

The psychometric properties of the above indicators have been tested and documented in the past studies or pilot studies. Each of them may include one to a few of questionnaire items. In addition to these indicators, there are also some indicators about the demographic characteristics of principals, teachers, students, the school and the community, administrative structure, financial management, personnel administration, curriculum and instruction, extra-curricular activities, external relations, discipline and regulations, and communications. Since most of the Hong Kong schools are aided schools, they are established and operated on the basis of the Codes of Aid issued by the Education Department of the Hong Kong Government. The sample of schools is relatively homogeneous in input quality in terms of salary structure, professional qualification of teachers and administrators, promotion structure, teacher-class ratios, school facilities, formal curricula to be completed, public examination system, supporting personnel (such as technical, clerical, cleaning staff), formal opportunities of professional training and development, and supervi-

sion by the Hong Kong Education Department (Education Ordinance, 1971). Therefore, this framework does not emphasize the quality of input that is often standardized in Hong Kong schools, but is more concerned with the quality of processe and outcome.

Application of the Framework and the Assessment Technology

In order to illustrate the application of the framework and the technology to monitoring education quality in schools, the findings of one study using this framework in 62 primary schools of one religious sponsoring body are summarized as follows:

This was a survey study conducted in May 1991 and June 1993 and it aimed to provide the sponsoring body and its schools the information about education quality in their schools that can be used to further develop their schools, administrators, teachers, and students.

Comparatively the survey in 1993 is more comprehensive than that in 1991. Therefore the findings presented in the report are mainly based on the data collected in 1993.

The sample schools were 29 AM schools (morning schools), 30 PM schools (afternoon schools), 3 whole day schools. If the AM and PM sessions in one school site have the same principal, they were taken as one school in the analysis. Otherwise, they were taken as two separate schools in the analysis.

The school age of the sample ranged from 4 to over 99 years. Number of classes in each sample school ranged from 6 to 48 with the mean around 23 classes. The average number of teachers in each school was 28 with the range from 9 to 60. The average number of students in each school was 764 with the range from 124 to 1,655.

The survey in 1993 included 56 principals, 1,407 teachers, 219 classes, and 7,102 mainly primary 6 students. In order to cut down the response set and the time taken for completing the measures, the numerous indicators of the above framework were divided and included into eight different sets of questionnaires to collect information: One for principals, one for teacher representatives, three for teachers, and three for students. The

sets of teacher questionnaires and student questionnaires were completed by different groups of teachers and students randomly selected within each sampled school and each sampled class. The time taken for each teacher or student to complete the questionnaire was round 30 minutes. For the principals, the time varied from 40 minutes to 3 hours, depending on the availability and readiness of some school data.

Description of Quality Profile of the Schools

In order to map an overall profile of education quality in the sample schools that can inform the concerned how good the education quality is provided in the schools, all the above indicators of the framework were used to describe the quality of school process at the student level, the teacher level, and the school organization level.

For the positive indicators, the higher the performance, the higher the quality can be promised at these indicators.

For the negative indicators, the higher the performance, the lower the quality can be promised at them.

In general, most of the indicators should be positive indicators except those denoted by the sign (-) at their ends, such as negative indicators: Feeling of homework overload (-), Intention to dropout (-), Coercive power (-), Insufficient recess time (-), Ignorance of art, physical education, and music (-), % time for student behavior problems (-), Disengagement (-), Hindrance (-), Hierarchy of authority (-), and Need for school improvements (-).

School performance on each indicator can be classified into three types:

--**High Performance** is defined by the value of school mean on one indicator larger than (mid point value of the scale + 0.5).

--**Low Performance** is defined by the value of school mean on one indicator less than (mid point value of the scale - 0.5).

--**Marginal Performance** is defined by the value of school mean on one indicator between

high performance and low performance.

Based on this classification, the quality profile of the sample schools was mapped by the percentages of schools with high, low, and marginal performance on each indicator, as shown in Figure 4.

In Figure 4,

% of schools with high performance is denoted by ■ ,

% of schools with low performance is denoted by ⋕ ,

% of schools with marginal performance is denoted by ▥ .

The characteristics at the different levels shown in Figure 4 can be used to monitor and improve education quality. For the detail of the discussion of the quality profile of these schools, please refer to Cheng (1994b).

Using the Profile for School Development

Some recommendations on how to use the mapped education profile for development and accountability should be provided to the concerned school practitioners or policy-makers. Mainly based on the purpose of facilitating organizational learning and development in the above study, the following recommendations were proposed for those concerned to enhance the education quality of the sample schools in this study:

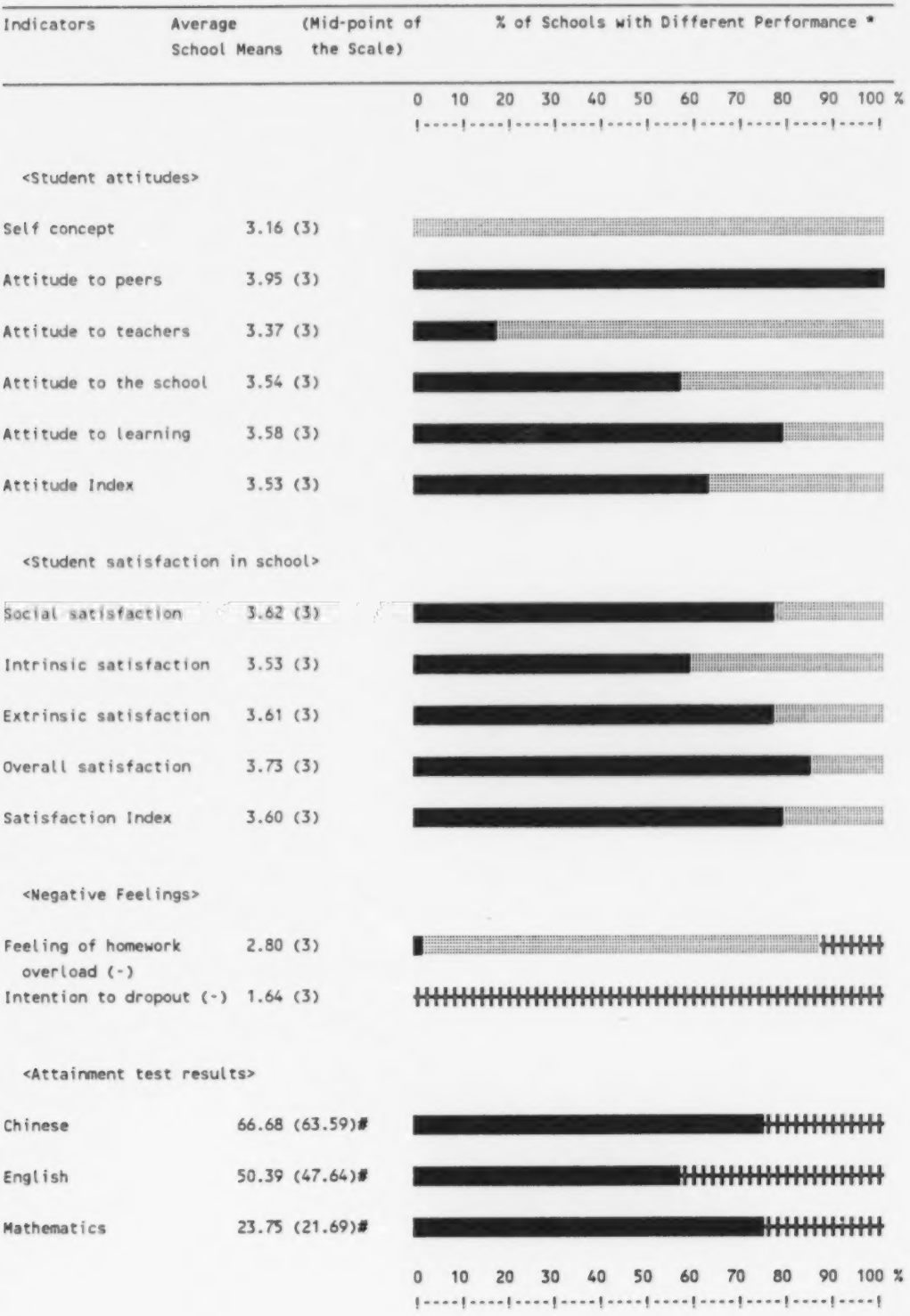
1. **Understanding and Discussing the Findings**:

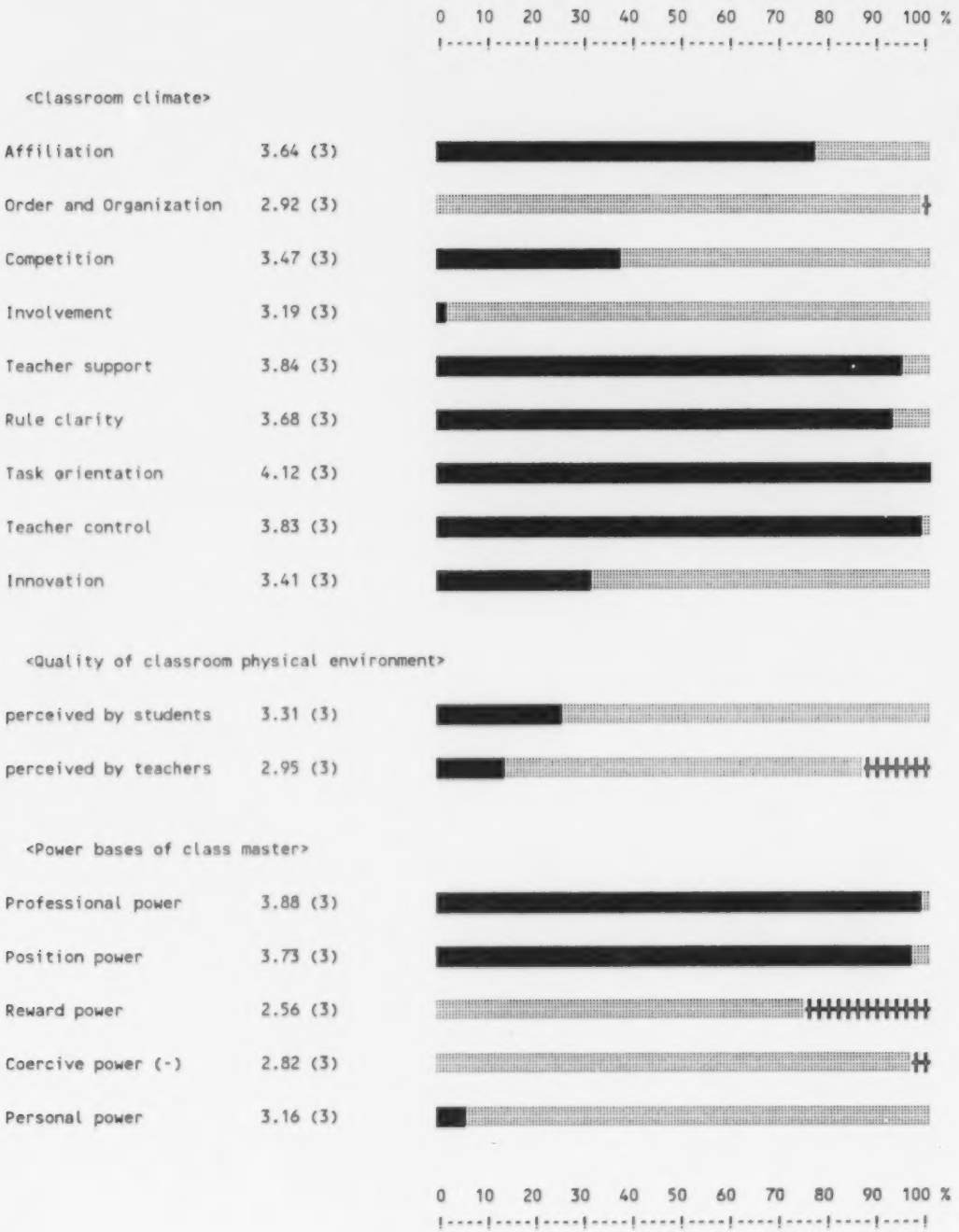
The sponsoring body, the school management committees, the supervisors, the principals, and senior teachers may first read the report carefully, clarify the information, and validate and the findings, and discuss the doubtful points (if any);

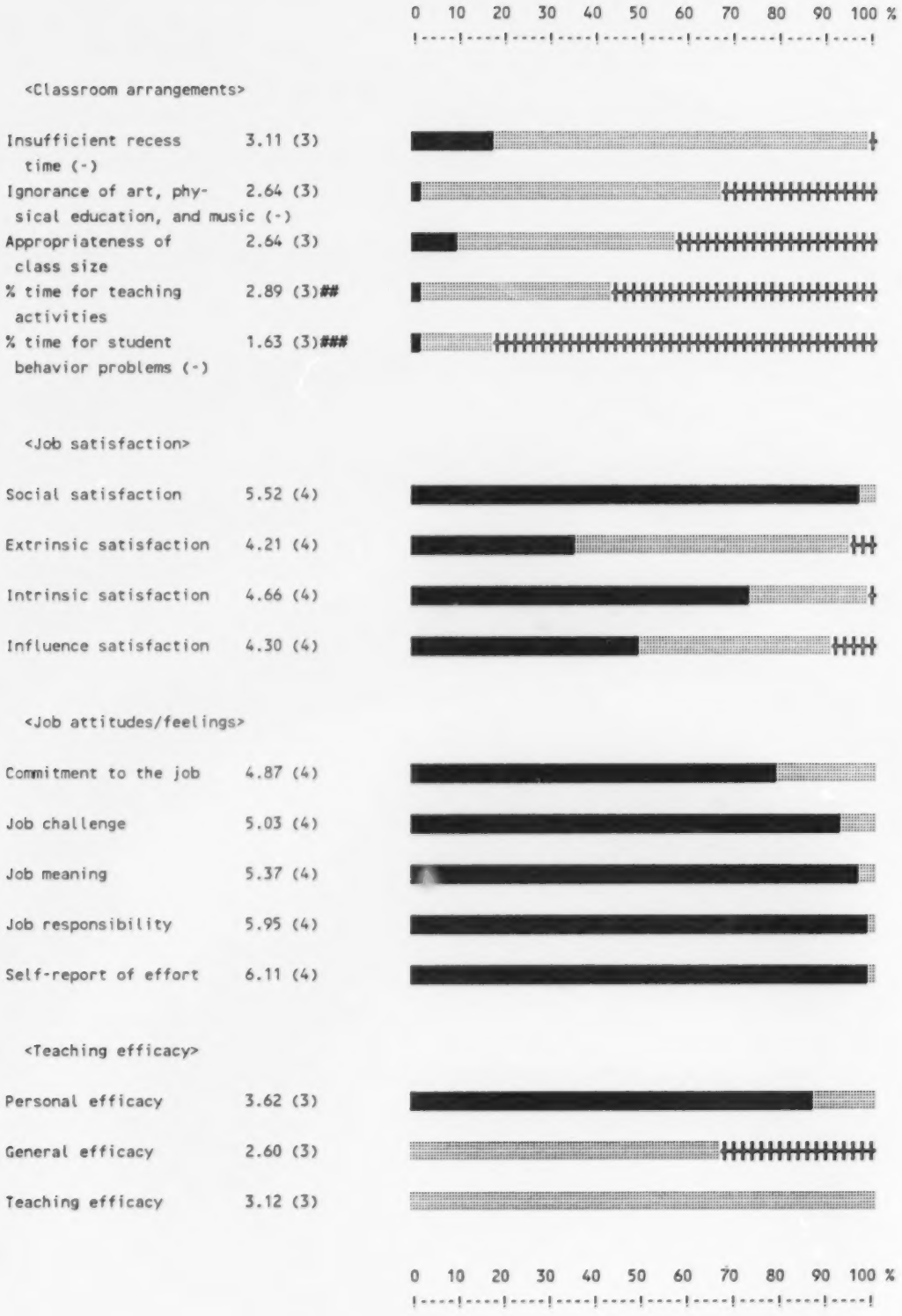
2. **Reflecting on the Quality Profiles of the Schools**:

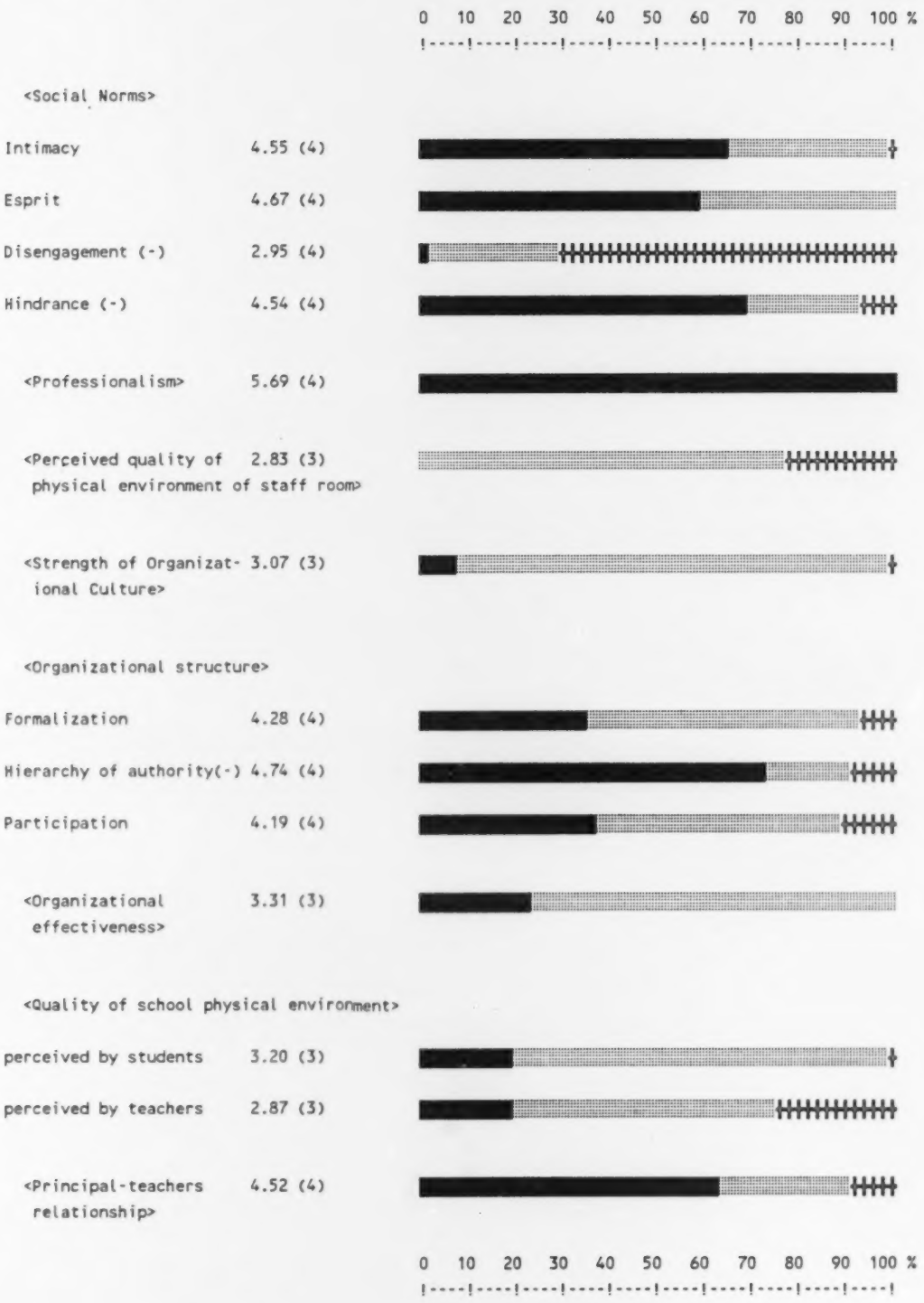
--They may further reflect on the characteristics of the quality profiles of the sample schools and classes and the implications that the researcher has listed after describing the characteristics of each indicator.

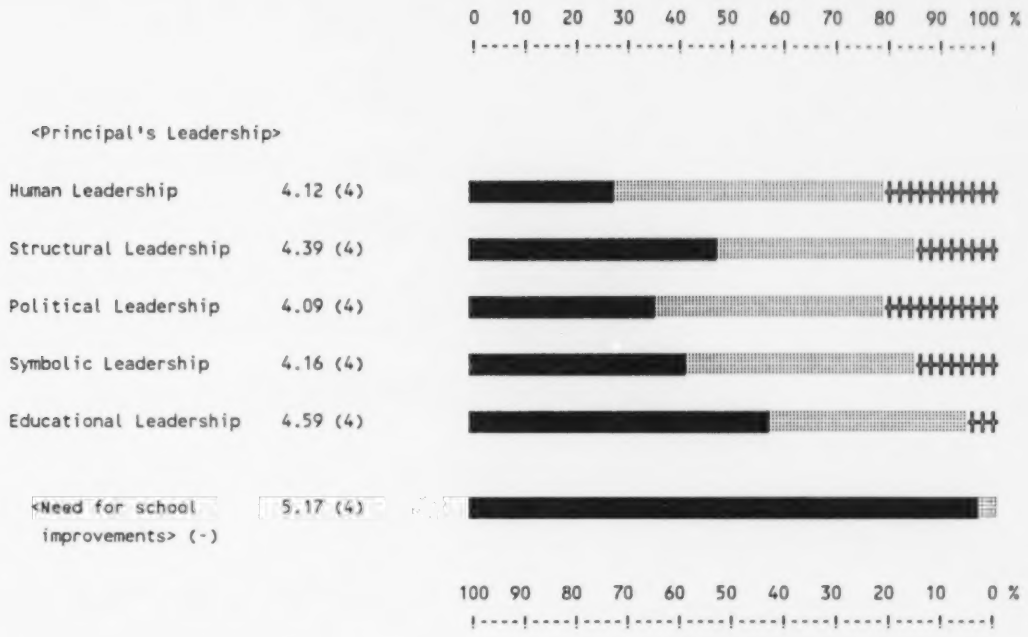
FIGURE 4
QUALITY PROFILE OF THE SAMPLE SCHOOLS




0 10 20 30 40 50 60 70 80 90 100 %
<Classroom climate>
Affiliation 3.64 (3)
Order and Organization 2.92 (3)
Competition 3.47 (3)
Involvement 3.19 (3)
Teacher support 3.84 (3)
Rule clarity 3.68 (3)
Task orientation 4.12 (3)
Teacher control 3.83 (3)
Innovation 3.41 (3)
<Quality of classroom physical environment>
perceived by students 3.31 (3)
perceived by teachers 2.95 (3)
<Power bases of class master>
Professional power 3.88 (3)
Position power 3.73 (3)
Reward power 2.56 (3)
Coercive power (-) 2.82 (3)
Personal power 3.16 (3)
0 10 20 30 40 50 60 70 80 90 100 %


0 10 20 30 40 50 60 70 80 90 100 %
<Classroom arrangements>
Insufficient recess time (-) 3.11 (3)
Ignorance of art, physical education, and music (-) 2.64 (3)
Appropriateness of class size 2.64 (3)
% time for teaching activities 2.89 (3)##
% time for student behavior problems (-) 1.63 (3)###
<Job satisfaction>
Social satisfaction 5.52 (4)
Extrinsic satisfaction 4.21 (4)
Intrinsic satisfaction 4.66 (4)
Influence satisfaction 4.30 (4)
<Job attitudes/feelings>
Commitment to the job 4.87 (4)
Job challenge 5.03 (4)
Job meaning 5.37 (4)
Job responsibility 5.95 (4)
Self-report of effort 6.11 (4)
<Teaching efficacy>
Personal efficacy 3.62 (3)
General efficacy 2.60 (3)
Teaching efficacy 3.12 (3)
0 10 20 30 40 50 60 70 80 90 100 %


0 10 20 30 40 50 60 70 80 90 100 %
<Social Norms>
Intimacy 4.55 (4)
Esprit 4.67 (4)
Disengagement (-) 2.95 (4)
Hindrance (-) 4.54 (4)
<Professionalism> 5.69 (4)
<Perceived quality of physical environment of staff room> 2.83 (3)
<Strength of Organizational Culture> 3.07 (3)
<Organizational structure>
Formalization 4.28 (4)
Hierarchy of authority(-) 4.74 (4)
Participation 4.19 (4)
<Organizational effectiveness> 3.31 (3)
<Quality of school physical environment>
perceived by students 3.20 (3)
perceived by teachers 2.87 (3)
<Principal-teachers relationship> 4.52 (4)
0 10 20 30 40 50 60 70 80 90 100 %



*note:

High performance is defined by the value of school mean larger than (mid point value of the scale + 0.5);
% of schools with high performance is denoted by ■
Low performance is defined by the value of school mean less than (mid point value of the scale - 0.5);
% of schools with low performance is denoted by ╫
Marginal performance is defined by the value between high performance and low performance.
% of schools with marginal performance in denoted by ▒

Note:

The number in bracket shows the average score of Hong Kong primary six students.

High performance is defined by the value larger than/ equal to 4 (i.e. 75% or above of class time used for teaching activities). Low performance is defined by the value less than 3 (i.e. 50% of class time used for teaching activities). Marginal performance is defined by the value between 50% and 74% of class time used for teaching activities.

High performance is defined by the value larger than/ equal to 3 (i.e. 50% or above of class time used for student problems). Low performance is defined by the value less than 2 (i.e. 25% of class time used for student problems). Marginal performance is defined by the value between 25% and 49% of class time used for student problems.

--They may identify those areas (not necessary all the researcher pointed out) most significant, prioritize them, and plan to do something on them. If necessary, they may investigate further these areas. (The basic information and the histograms of indicators in the appendices may also be helpful for discussion and reflection).

--Each school should use the profile of education quality of its own school to compare with the overall profile and reflect on its strengths and weaknesses.

--It is strongly recommended that they should involve their teachers to reflect on their school profiles.

--Reflection on the quality profiles is a necessary step for staff (including administrators) development and school development planning.

3. **Planning Development Actions**:

--According to their own reflection and the above listed implications of the findings, the sponsoring body, the principals association, and the individual schools may have different perspectives to plan development actions. The sponsoring body and the association may have broader perspectives and their plans may have a target of more schools. The school administrators may focus on their own schools.

--They may consider to encourage participation of those concerned in formulating the development action plans.

--School development inevitably includes development of principals, administrators, and staff as well the social, psychological, and physical aspects of school environment. Therefore, a balanced, realistic, and long-term plan may be necessary.

4. **All Information should be used mainly for the Purpose of Learning and Development** :

--They should try every effort to make sure that the findings and profiles are used only for the purpose of learning and development of the schools, administrators, and teachers.

--Using the information for other control purposes (e.g. administrative evaluation)

should be very careful because it may create self-defensive mechanism or interpersonal conflicts that certainly hinter any positive learning among administrators and teachers.

--Establishing an open and supportive climate is very important for effective learning from the above information.

After the research, the author had written a report and conducted a seminar to explain the findings and help the managers of the sponsoring body, school supervisors, principals, and vice-principals to understand and use the profiles of education quality in school improvement and development. The responses from the participants were very encouraging. They found the profiles very helpful not only to the sponsoring body in formulating policies to help the schools but also to the individual schools in planning school-based development.

Limitations of the Study and the Framework

The above study was mainly based on the information provided by the key actors in schools--principals, teachers, and students. Other important school constituencies such as parents, school management committees, the school sponsoring body, and the Education Department had not been surveyed. Of course, this sets one limitation to the findings of the study. Even though a rather comprehensive set of indicators at multiple levels including the student individual/class levels, the teacher individual/group levels, and the school organization level had been conceptualized and used to describe education quality of the sample schools, it does not mean all aspects of school process and education process had been included. For example, curriculum, teaching methods, staff development, community relations and services, school-home relations, etc. had not been investigated. With the constraint of resources, inevitably every study has its limitations. If we accept that education quality reflects the overall performance of school members at the individual level, the group level, and the organizational level including affective, cognitive, and behavioral components and can be indicated by the satisfaction, perception, and performance of

students, teachers, and principals, the findings of this survey can provide us rather comprehensive information to further develop the schools, administrators, teachers, and students. Of course, the framework can be further developed in future in order to redress these limitations.

Conclusion

Education quality is the focus of the current educational reforms not only in Hong Kong but also in many other countries and regions. Education quality in school is a vague concept, covering a wide range of factors related to the inputs, processes, and outcomes of the school as well as the satisfaction and expectation of the school constituencies. We may define it as the character of the set of elements in the input, process, and output of the education system that provides services that completely satisfy both internal and external strategic constituencies by meeting their explicit and implicit expectations. Education indicator is used to describe the key aspects of education quality in input, process, and outcome at the school level or at the system level. And education standard is a reference point for the statistic or performance of an education quality indicator to be judged as high or low.

The information provided by the quality indicators and judged education standards can used to serve two basic functions: one for internal improvement and development of the schools or the school system and the other for accountability and assurance of quality or cost-effectiveness. Based on the choice of indicators, the purpose of monitoring, and the type of evaluation, a matrix can be formed to explore the critical issues in assessing and monitoring education quality. There may be three approaches to designing the assessment and monitoring. Among them, the whole matrix approach should be most powerful and can produce more comprehensive, reliable, and useful information for enhancing education quality and improving school. Inevitably, it is more expensive and time-consuming.

From the matrix of monitoring education quality, we can see that some basic

dilemmas and issues have to be faced up. How to keep a balance between the basic functions of monitoring, how to keep a balance between school self-evaluation and external evaluation, how to choose an appropriate combination of quality indicators, who make decision on the choice of indicators and standards, and how to manage the differences in evaluation between the school level and the school system level are critical dilemmas for research, policy discussion and formulation, and school practice in studying, designing, and implementing the assessment and monitoring of education quality in schools. In general, we should accept the potential differences of assessment between the school level and the school system level in terms of the choice of indicators, the purpose, and the type of evaluation.

The development of the comprehensive framework including multi-levels and multi-indicators and the application of the framework to monitoring education quality of a sample of Hong Kong schools provide an example showing that the framework and the assessment technology are feasible and useful and can serve the purposes of both internal development and external accountability. Furthermore, the development of framework is based on the literature not only from the Western socieities but also from the Eastern regions, therefore it is hoped that this framework can contribute to the growing public concern, policy discussion, research conceptualization, and practice on education quality and school development in both local and international contexts.

The information from assessing and monitoring education quality and standards can be used to develop some measures or strategies for improvement of education and enhancement of quality. There may be many different ways to improve education quality and standards at the school level or at the system level. According to Cheng (1993b), the basic approaches to enhancing education quality can be classified as the external control approach and the school-based approach:

1. **External Control Approach** -- This is a traditional approach that is based on the principles of "standard structure" and " centralization", emphasizes the function of the struc-

tural system, and assumes the schools as "passive implementing tools" (Cheng, 1993b). The role of external control and close supervision from the central authority (e.g. Education Department) or external agent is strongly emphasized. Therefore, improvement of education quality mainly depends on larger input and Education Department's close supervision, evaluation, and intervention to schools. This approach is often very expensive and ineffective because it fails to motivate schools' commitment to self improvement.

2. **School-based Approach** -- This is a new approach following the current school management reform -- school-based management that is based on the principles of " equifinality" and "decentralization", emphasizes flexibility and school's own initiative and self development for better education quality, and assumes the schools as "self-managing systems" (Cheng, 1993b). Enhancement of education standards can be achieved through a school-based mechanism comprised of strategic/development planning, staff development, and self-evaluation (Cheng, 1994a). The worldwide movements of transforming the schools from the external control management mode to the school-based management mode reflect the importance of the school-based approach to school improvement and education quality (Cheng, 1993b; Caldwell & Spinks, 1988). As a form of school-based management, the school management reform--School Management Initiative (SMI) implemented in Hong Kong adopts this approach to enhance education quality in schools (Education & Manpower Branch and Education Department, 1991).

From the insights of current educational reforms, we should promote the application of education indicators and standards as an important approach to enhancement of education quality in Hong Kong schools. But, without the full support from the education profession, it is impossible to develop a good monitoring system of education quality and implement it effectively. We should encourage all the concerned to discuss and understand the function, conception, assessment, and application of education indicators and standards before implementation of any monitoring system at the school-level or at the school system level.

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